VII is therefore only about 160 mAh/g, which is considered to be in an acceptable range for practical lithium ion batteries. The surface area measured by the conventional BET method for sample VII was 217 m^2/g. If this area were all accessible to electrolyte, such low values for the irreversible capacity would not be expected (for example, based on the disclosure of U.S. Patent No. 5,028,500). However, the MB adsorption capacity is relatively low (<5 micromoles/g) for this and the other invention samples tested.

Please replace the paragraph at page 46, lines 1-15, with the following rewritten paragraph:

Figures 18a and 18b show the first discharge-charge cycle for the series of pyrolyzed A type precursors. The samples heated at 700°C and 800°C show significant hysteresis in the voltage profile (Li is inserted near 0V but is removed near 1.0V). This has been ascribed to the large hydrogen content in the samples. Upon heating to 900°C, the hysteresis is predominantly eliminated and the samples show substantial capacity at low voltage. 18c shows the second cycle of the same series. The vertical lines indicate the onset of lithium plating during discharge. The batteries prepared from material heated to 900°C and 1000°C appear most promising for this series. Their reversible capacities are about 510 and 450 mAh/g respectively.

IN THE CLAIMS

Please amend claims 45-57 and 60-69 as follows:

45 ~~44~~. (Amended) A process for preparing a pre-graphitic carbonaceous host for a carbonaceous insertion compound comprising pyrolyzing an epoxy precursor, or a phenolic resin precursor, or a carbohydrate precursor or a carbohydrate containing precursor at a temperature above 800°C, and within a temperature range effective to produce an H/C atomic ratio less than about 0.1 and an empirical parameter R for said host wherein R:

(i) is determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffractive beam monochronometer, with the X-ray beam of said

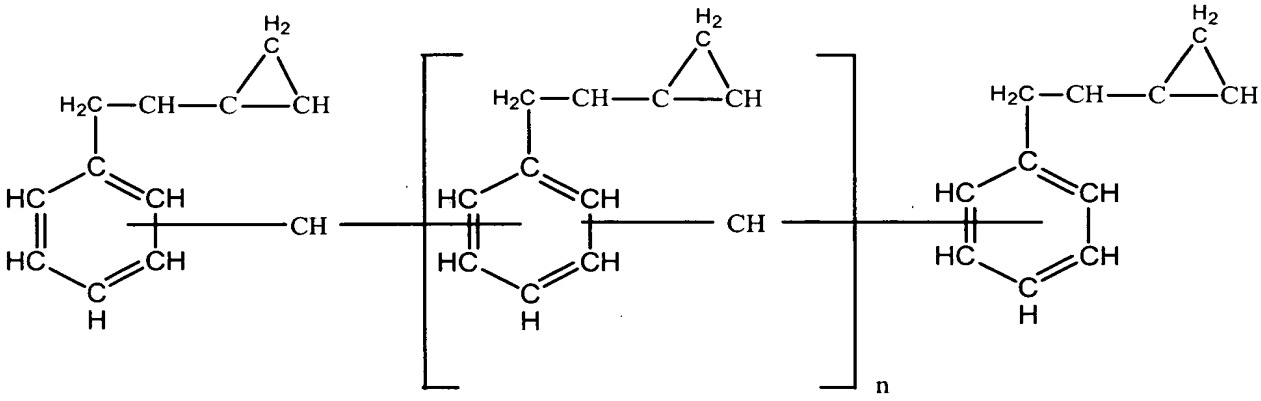
diffractometer being confined to the sample in the angular range from 10° to 35° in scattering angle,

(ii) is defined as the {002} peak divided by the background level, and

(iii) is less than about 2.2.

46 45
~~43~~. (Amended) A process as claimed in claim ~~44~~, comprising pyrolyzing an epoxy precursor.

47 46
~~46~~. (Amended) A process as claimed in claim ~~45~~ wherein the epoxy precursor is an epoxy novolac resin with formula

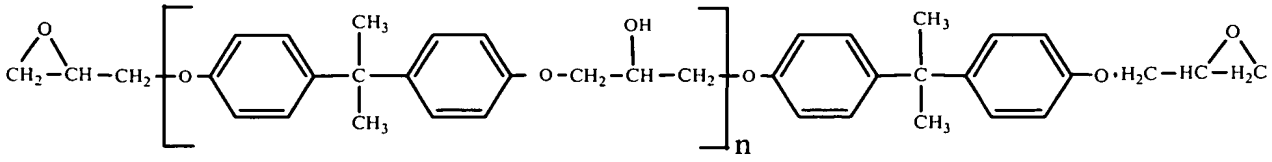


Epoxy Novolac Resin

n = 1.6

and the pyrolysis is performed at a maximum temperature below about 1100°C.

48 46
~~47~~. (Amended) A process as claimed in claim ~~45~~ wherein the epoxy precursor is abisphenol A epoxy resin with formula



Bisphenol-A Epoxy Resin n = 12

and the pyrolysis is performed at a temperature about 800°C.

49 45
~~48~~. (Amended) A process as claimed in claim ~~44~~, comprising pyrolyzing a phenolic resin precursor.

50 47
~~49~~. (Amended) A process as claimed in claim ~~48~~ wherein the phenolic resin precursor is of the novolac type.

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51 47
~~50~~. (Amended) A process as claimed in claim ~~48~~ wherein the phenolic resin precursor is of the resole type.

52 49
~~51~~. (Amended) A process as claimed in claim ~~50~~ wherein the pyrolysis is performed at a temperature in the range from about 900°C to about 1100°C.

53 43
~~52~~. (Amended) A process as claimed in claim ~~44~~, comprising pyrolyzing a carbohydrate precursor or a carbohydrate containing precursor.

54 53
~~53~~. (Amended) A process as claimed in claim ~~52~~ wherein the carbohydrate precursor is selected from the group consisting of sugar, starch, and cellulose.

55 53
54. (Amended) A process as claimed in claim 52 additionally comprising precarbonizing the carbohydrate by washing with an acid.

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56 55
55. (Amended) A process as claimed in claim 54 wherein the carbohydrate is sucrose.

57 55
56. (Amended) A process as claimed in claim 54 wherein the acid is concentrated sulfuric acid.

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60. (Amended) An electrochemical device comprising an electrode, wherein at least a portion of said electrode comprises a carbonaceous insertion compound, said carbonaceous insertion compound comprising: a pre-graphitic carbonaceous host prepared by the method of claim 44; and atoms of an alkali metal inserted into the carbonaceous host.

62 61
61. (Amended) An electrochemical device as claimed in claim 60, wherein said carbonaceous insertion compound comprises a pre-graphitic carbonaceous host prepared by pyrolyzing an epoxy precursor.

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63 62
62. (Amended) An electrochemical device as claimed in claim 61 wherein the epoxy precursor is a novolac epoxy resin.

64 62
63. (Amended) An electrochemical device as claimed in claim 61 wherein the epoxy precursor is a bisphenol A epoxy resin.

65 61
64. (Amended) An electrochemical device as claimed in claim 60, wherein said carbonaceous insertion compound comprises a pre-graphitic carbonaceous host prepared by pyrolyzing a phenolic resin precursor.

66 65
65. (Amended) An electrochemical device as claimed in claim 64 wherein the phenolic resin precursor is of the novolac type.

~~66~~ 69. (Amended) An electrochemical device as claimed in claim 64 wherein the phenolic resin precursor is of the resole type.

~~67~~ 68. (Amended) An electrochemical device as claimed in claim 60, wherein said carbonaceous insertion compound comprises a pre-graphitic carbonaceous host prepared by pyrolyzing a carbohydrate precursor or a carbohydrate containing precursor.

~~68~~ 69. (Amended) An electrochemical device as claimed in claim 67 wherein the carbohydrate precursor is selected from the group consisting of sugar, starch, and cellulose.

Please add claims 71-88:

70 An electrochemical device comprising an electrode wherein at least a portion of the electrode comprises a carbonaceous insertion compound comprising:

(a) a pre-graphitic carbonaceous host having a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte wherein

(i) the empirical parameter R for said carbonaceous insertion compound:
(A) is, determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffracted beam monochronometer, with the X-ray beam of said diffractometer being confined to the sample in the angular range from 10° to 35° in scattering angle,
(B) is defined as the height of the centre of the {002} peak divided by the background level, and
(C) is less than about 2.2;

(ii) the H/C atomic ratio is less than about 0.1; and

(iii) the electrolyte accessible surface area is sufficiently small such that the irreversible capacity is less than about a half that of the reversible capacity;

(b) and alkali metal atoms reversibly inserted into the carbonaceous host in an amount greater than that which can be reversibly inserted into graphite.

71. An electrochemical device according to claim 70, wherein the alkali metal is lithium.

72. A battery comprising an electrode wherein a portion of the electrode comprises a carbonaceous insertion compound comprising:

(a) a pre-graphitic carbonaceous host having a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte wherein

(i) the empirical parameter R for said carbonaceous insertion compound:
(A) is, determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffracted beam monochronometer, with the X-ray beam of said diffractometer being confined to the sample in the angular range from 10° to 35° in scattering angle,
(B) is defined as the height of the centre of the {002} peak divided by the background level, and
(C) is less than about 2.2;

(ii) the H/C atomic ratio is less than about 0.1; and

(iii) the electrolyte accessible surface area is sufficiently small such that the irreversible capacity is less than about a half that of the reversible capacity;

(b) and alkali metal atoms reversibly inserted into the carbonaceous host in an amount greater than that which can be reversibly inserted into graphite.

73. A battery according to claim 72, wherein the alkali metal is lithium.

74. A battery comprising an electrode wherein a portion of the electrode comprises a carbonaceous insertion compound prepared according to the process of claim 44.

75. A battery as claimed in claim 75, wherein a portion of the electrode comprises a carbonaceous insertion compound prepared by pyrolyzing an epoxy precursor compound comprising an epoxy novolac resin.

76. A battery as claimed in claim 75, wherein a portion of the electrode comprises a carbonaceous insertion compound prepared by pyrolyzing an epoxy precursor compound comprising a Bisphenol A epoxy resin.

77. A battery comprising an electrode wherein a portion of the electrode comprises a carbonaceous insertion compound prepared by the process of claim 48.

78. A battery comprising an electrode wherein a portion of the electrode comprises a carbonaceous insertion compound prepared by the process of claim 52.

79. A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound comprising:

(a) a pre-graphitic carbonaceous host having a reversible capacity for lithium insertion, an irreversible capacity for lithium insertion, and a surface area accessible to a non-aqueous electrolyte wherein

(i) the empirical parameter R for said carbonaceous insertion compound:

(A) is, determined by X-ray diffraction using a diffractometer equipped with a copper target X-ray tube and a diffracted beam monochronometer, with the X-ray beam of said diffractometer being confined to the sample in the angular range from 10° to 35° in scattering angle,

(B) is defined as the height of the centre of the {002} peak divided by the background level, and

(C) is less than about 2.2;

(ii) the H/C atomic ratio is less than about 0.1; and

(iii) the electrolyte accessible surface area is sufficiently small such that the irreversible capacity is less than about a half that of the reversible capacity;

(b) and lithium atoms reversibly inserted into the carbonaceous host in an amount greater than that which can be reversibly inserted into graphite.

80
~~81~~. A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by the process of claim ~~44~~ 43, wherein the alkali metal is Li.

81
~~82~~. A non-aqueous battery as claimed in claim ~~81~~ 80 comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by pyrolyzing an epoxy precursor compound comprising a novolac resin.

82
~~83~~. A non-aqueous battery as claimed in claim ~~81~~ 80 comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by pyrolyzing an epoxy precursor compound comprising an epoxy novolac resin.

83
~~84~~. A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by the process of claim ~~48~~ 47.

~~85~~ 86. A non-aqueous battery comprising: a cathode comprising a lithium insertion compound; a non-aqueous electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising a carbonaceous insertion compound prepared by the process of claim ~~52~~ 53.

~~86~~ 87. The electrochemical device as claimed in claim ~~62~~ 63 wherein the alkali metal is lithium and the electrochemical device is a non-aqueous battery, the battery comprising a cathode comprising a lithium insertion compound; a non-aqueous battery electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising said carbonaceous insertion compound.

~~87~~ 88. The electrochemical device as claimed in claim ~~65~~ 66 wherein the alkali metal is lithium and the electrochemical device is a non-aqueous battery, the battery comprising a cathode comprising a lithium insertion compound; a non-aqueous battery electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising said carbonaceous insertion compound.

~~88~~ 89. The electrochemical device as claimed in claim ~~68~~ 69 wherein the alkali metal is lithium and the electrochemical device is a non-aqueous battery, the battery comprising a cathode comprising a lithium insertion compound; a non-aqueous battery electrolyte comprising a lithium salt dissolved in a mixture of non-aqueous solvents; and an anode comprising said carbonaceous insertion compound.